Advertising Exclusive Links for Flex-Algorithm in IGP

draft-gong-lsr-exclusive-link-for-flex-algo-01

Liyan Gong (China Mobile)

Weiqiang Cheng (China Mobile)

Changwang Lin (New H3C Technologies)

Mengxiao Chen (New H3C Technologies)

Ran Chen (ZTE Corporation)
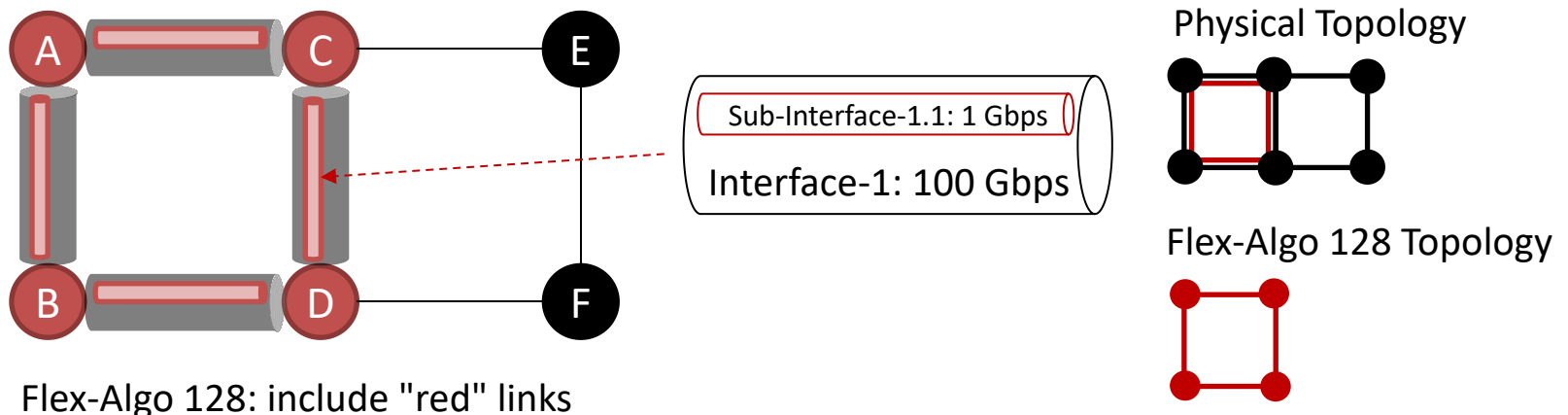
Yanrong Liang (Ruijie Networks Co., Ltd.)

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Background

- Flex-Algorithm allows IGP to compute constraint-based paths.

- In some scenarios, exclusive links may be deployed for Flex-Algorithm. However, these links are also included in normal SPF calculation, and unexpected flows may be steered into them.

- This draft proposes a method to advertise exclusive links for Flex-Algorithm in IGP.
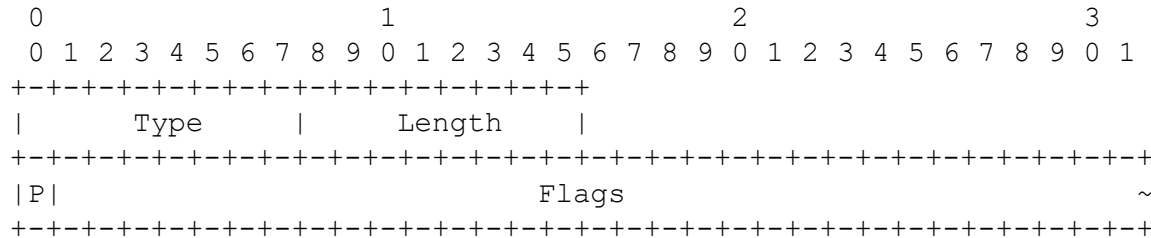
Problem

- Flex-Algorithm 128 are used to transmit particular flows, such as network slice. The "red" links used by Flex-Algorithm 128 are sub-interfaces with dedicated bandwidth resource.

- It is expected that only the particular flows are transmitted on "red" links.

- However, all links are contained in the default topology used by normal SPF calculation, and flows of best-effort service may be steered into "red" links.

Flex-Algo 128: include "red" links

Sub-Interface-1.1: 1 Gbps
Interface-1: 100 Gbps

Physical Topology

Flex-Algo 128 Topology

Extension to Prune Links

- IS-IS Link Flags sub-TLV:

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Type     |     Length    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|P|                            Flags                          ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

P-Flag: Pruning the link during SPF calculation.
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- Link Flags sub-TLV is advertised in:

  - TLV-22 (Extended IS reachability) [RFC5305]

  - TLV-222 (MT-ISN) [RFC5120]

  - TLV-23 (IS Neighbor Attribute) [RFC5311]

  - TLV-223 (MT IS Neighbor Attribute) [RFC5311]

Another Way to Discuss

Advertising the metric of Flex-Algorithm links as the maximum value (2^24-1) can also lead to the pruning of these links in normal SPF Calculation.

- But, it restricts the Flex-Algorithm from using IGP-Cost as its metric-type

- It does not work with OSPF. For OSPF, the links with maximum metric value(65535) are also included in the SPF calculation, even if not preferred. if there are no other preferred paths, the Flex-Algoritnm links will still affect the result of the normal SPF calculation.

Next Steps

- Any questions or comments are Welcome

- Request further review and feedback

gongliyan@chinamobile.com

chengweiqiang@chinamobile.com

linchangwang.04414@h3c.com

chen.mengxiao@h3c.com

chen.ran@zte.com.cn

liangyanrong@ruijie.com.cn

Thanks